

## PLATE XCII.

- Fig. 12. Upper view of skull of *Dicynodon laticeps* Broom.  $\frac{5}{12}$  nat. size.  
 Fig. 13. Under view of snout of *Dicynodon laticeps* Broom.  $\frac{5}{18}$  nat. size.  
 Fig. 14. Side view of skull of *Dicynodon lutriceps* Broom.  $\frac{5}{12}$  nat. size. The contact between the front part of the skull and the occiput is missing, but the relation of the parts must be almost as restored.  
 Fig. 15. Upper view of skull of *Dicynodon lutriceps* Broom. About  $\frac{5}{14}$  nat. size.  
 Fig. 16. Palatal view of skull of *Dicynodon lutriceps* Broom. About  $\frac{5}{13}$  nat. size.  
 Fig. 17. Upper view of skull of *Dicynodon psittacops* Broom. About  $\frac{1}{2}$  nat. size.

## PLATE XCIII.

- Fig. 18. Side view of skull of *Endothiodon whaitsi* Broom. About  $\frac{2}{3}$  nat. size.  
 Fig. 19. Upper view of lower jaw of *Endothiodon platyceps* Broom. About  $\frac{5}{18}$  nat. size.  
 Fig. 20. Upper view of skull of *Emydops minor* Broom.  $\frac{5}{11}$  nat. size.  
 Fig. 21. Side view of skull of *Prodicynodon beaufortensis* Broom. About  $\frac{7}{10}$  nat. size.  
 Fig. 22. Upper view of skull of *Ictidopsis elegans* Broom.  $\frac{5}{6}$  nat. size.  
 Fig. 23. Side view of left dentary of *Nyctosaurus browni* Broom.  $\frac{4}{5}$  nat. size.

53. On the Hydrocoralline Genus, *Errina*. By Professor S. J. HICKSON, F.R.S., F.Z.S., The University of Manchester.

[Received April 29, 1912: Read June 4, 1912.]

(Plates XCIV.-XCVI.)

INDEX.	Page
Revision of the genera <i>Errina</i> , <i>Labiopora</i> , <i>Spinipora</i> .....	877
Description of new species .....	882
Notes on the structure of <i>Errina novæ zelandiæ</i> .	884
Note on geographical distribution .....	886
Description of old species .....	887
General remarks on structure .....	891
List of known species .....	893
Additional notes .....	894
Literature .....	894
Explanation of the Plates .....	895

Four years ago Professor Benham sent to me some specimens of Stylasterina from New Zealand, with a request that I would name them for him. At the same time he forwarded some notes and drawings which have proved to be of considerable assistance to me in working out their details. I am also indebted to Professor Dendy for the loan of another specimen also from New Zealand; to the late Mr. Morgan, of Worthing, for the loan of a specimen from an unknown locality; and to Mr. Gilchrist for a specimen from the Cape of Good Hope.

All these specimens clearly belong to one of three genera, *Errina*, *Labiopora* or *Spinipora*, as they exhibit the characters that these genera exhibit in common and by which they can be separated from other Stylasterina. These characters are: (1) a



1.



2.



3.



4.

HYDROIDS OF THE GENUS ERRINA.

Huth, coll.





5.



6.



7.



8.

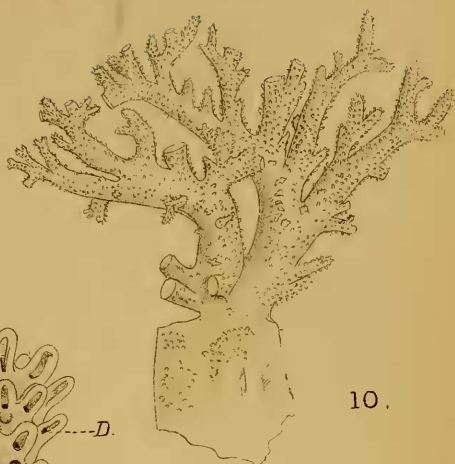
HYDROIDS OF THE GENUS ERRINA.

Huth, coll.

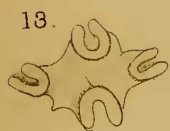




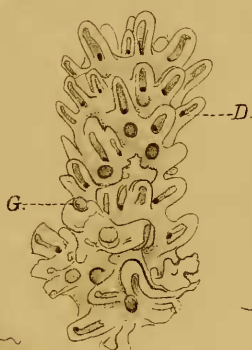
9.



10.



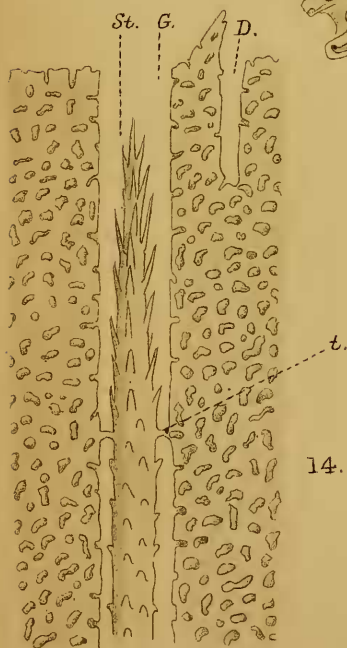
13.



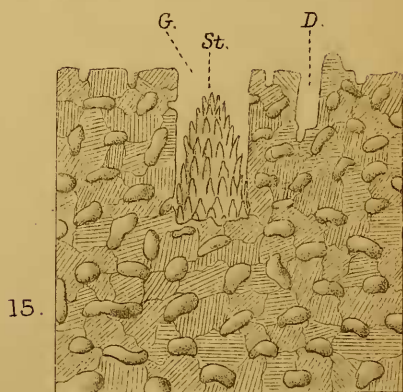
11.



12.



14.



15.

Ruth, Lith<sup>r</sup> London.

HYDROIDS OF THE GENUS ERRINA.





style in the Gasteropores; (2) no style in the Dactylopores; and (3) the Dactylopores, or some of the Dactylopores, guarded by a grooved lip or spine—called by Moseley the “nariform process.”

To any one acquainted with Moseley’s classical memoir of the *Stylasterina* (8), and with the subsequent literature, which is not very extensive, it might seem a simple matter to determine whether the specimens about to be described belong to any one of the three genera or not; because, according to Moseley’s descriptions, the following characters were diagnostic:—

*Errina*, with only one kind of Dactylopores.

*Labiopora*, with two kinds of Dactylopores. The larger kind of dactylopores with a nariform process\* and arranged in rows. The smaller kind of dactylopores, without a nariform process, arranged between the rows.

*Spinipora*, also with two kinds of Dactylopores. The larger kind of dactylopores with long grooved spines, not arranged in rows. The smaller kind of dactylopores at the base of the larger ones.

Moseley’s memoir was published in 1881, and since that date only four new species of *Errina* and one new species of *Labiopora* (*L. moseleyi*) have been described; but owing to the rarity of these Hydrocorallines in the seas that have been recently investigated, very little progress has been made in our knowledge of them.

The specimens from New Zealand and elsewhere that I have examined convinced me that a thorough revision of the genera was necessary, and consequently the task of naming Professor Benham’s specimens has taken me much longer than I anticipated. The general results of my investigations have been to show that the limits or frontiers between the three genera are ill-defined and that it is necessary to accept von Marenzeller’s (6) proposal to unite *Labiopora* with *Errina*.

In the first place, I have found, as von Marenzeller (6) has done, that the presence of two kinds of dactylopores is not a very reliable character; because in some forms that are otherwise closely related the dactylopores of the smaller kind that have no grooved spines may be numerous, scarce, or altogether absent (e. g., *Errina novæ zelandiæ*). A genus such as *Labiopora* cannot therefore be absolutely separated from *Errina* by the character of the dimorphism of the dactylozooids.

Moreover, the arrangement of the grooved spines in definite rows is another character that is subject to considerable variations and cannot be relied upon for diagnostic purposes. The arrangement of these processes seems to be correlated in some way with the method of growth of the hydrophytum as a whole, and that is again, I believe, dependent upon the conditions of the environment.

\* The term “nariform process” introduced by Moseley is not very convenient, and I have consequently used the expression “grooved spine” for the cenosteal processes that shelter the dactylozooids.



The characters that appear to me of more importance and to signify a more profound differentiation are based upon:—

1. The texture of the surface of the corallum.
2. The aspect of the grooves in the nariform processes.

Moseley described the surface of *Errina* as composed of a compact, hard, glistening, white, calcareous tissue, and he adds that the canals generally are in this genus larger in proportion to the size of the zooids than in most other forms, and the mesh-works formed by them are comparatively wide open. Associated with these two characters we usually find that the surface is marked by shallow longitudinal grooves perforated by a series of small apertures through which the vertical canals pass. These cœnosteal pores are well defined in the species of this group that I have examined, and in the type specimens of *E. labiata* and *E. ramosa* they are about .05 mm. in diameter. The surface of *Spinipora* is hard and compact as in *Errina*, and it is also perforated by well defined cœnosteal pores.

In the original description of the genus *Labiopora*, Moseley describes the cœnosteum as being "minutely reticulate in texture," and in the description of *Labiopora moseleyi* Ridley (10) also describes the surface as being "minutely reticulate." In all the specimens I have examined there is a very marked contrast between the surface of the specimens now included in the *Labiopora* group of species and of those I propose to retain in the *Errina* group.

I should prefer to describe the surface of the former group of species as being "granular" rather than "reticulate." In *Errina* (*Labiopora*) *capensis* it is coarsely granular and in all the other species of the group it is minutely granular (*cf.* Pl. XCVI. figs. 14 & 15). Below the surface, the cœnosteum is minutely reticulate, being perforated by a network of small-meshed canal passages (fig. 14), in contrast with the wide-meshed canal passages of the *Errina* group.

As regards the grooved spines. In the following species that I have examined the groove in the spine that protects a dactylo-pore is turned towards the apex of the branch on which it is situated: *E. labiata*, *E. horrida*, and *E. ramosa*. The groove has the same aspect in *E. glabra* and *E. carinata*, if we may judge from the figures given by Pourtales (9).

In the only two specimens of the genus *Spinipora* that are known the grooves also turn towards the apex of the branch (Pl. XCV. fig. 8). In the *Labiopora* group of species there is considerable variation in the direction of the grooves. In some of them, all or nearly all the grooves are turned away from the apex (Pl. XCVI. fig. 11), but in others the grooves are turned in all directions, the grooved spines forming irregular clusters on the surface (Pl. XCVI. figs. 12 & 13). The same arrangement of the grooves occurs in *Errina gracilis* and in *Errina macrogastera*, according to von Marenzeller, who writes "Ihre Oeffnung ist nach hinten gerichtet, selten seitlich" (5), and also in *Errina fissurata* of Gray (2).

Taking these characters as guides it seemed to me that the diagnostic characters of the three genera might be stated as follows:—

- (a) Cœnosteum hard and compact, perforated by well-defined cœnosteal pores. Grooved spines turned towards the apex of the branch.
1. With short grooved spines and only one kind of dactylopore ..... *Errina*.
  2. With long grooved spines and two kinds of dactylopores..... *Spinipora*.
- (b) Cœnosteum granular and reticulate, without well-defined cœnosteal pores. Grooved spines turned away from the apex of the branches or irregularly placed ..... *Labiopora*.

If the three genera be joined together to form a subfamily, the Errinina, this subfamily might be defined as follows:—

Hydrophytum arborescent and irregularly flabelliform, gastropores and dactylopores not arranged in cyclo-systems. Gastropores with a large brush-like style. Dactylopores without a style. Some of the dactylopores protected by a grooved spine (narial process) on the surface of the cœnosteum.

This arrangement of the genera, however, breaks down on further analysis, and I see no other course than to arrange all the species in three groups under the one generic name *Errina*.

The genus *Errina* was founded by Gray in 1835 for a species of coral found in the Mediterranean Sea and formerly called *Millepora aspera* by Linnæus.

As von Marenzeller has pointed out, Gray's description of the spines in this species as "Superne longitudinaliter fissæ" is not consistent with the description of the species known to Linnæus and Esper.

I have examined the type specimens in the British Museum, and have found that Gray's description is not correct. The spines in these specimens are irregular in arrangement, but where they are isolated and not in clusters the groove is directed *away* from the apex. Moreover, the character of the surface of the cœnosteum, the presence of a few small dactylopores without grooved spines, and other features prove that this species is more closely related to the type species of *Labiopora* than it is to any of the other species of *Errina*.

According to the system I had, at first, proposed the type species of *Errina* would thus be a species of *Labiopora* and Moseley's *Errina ramosa* would become the type species of the genus.

Such a proposal, therefore, would not only be contrary to the rule of zoological nomenclature, but it would also be extremely inconvenient. Moreover, one species at least (*E. macrogastra*) would occupy an intermediate position, having a surface similar

to that of *Errina* and grooved spines similar to those of *Labiopora*.

A plea might still be made to keep the genus *Spinipora* distinct, but I am convinced that intermediate forms will be found between the deep-sea species of *Errina* and the only known species of *Spinipora*, and that sooner or later it will be found impossible to keep it apart from the others.

In the following pages, therefore, I have regarded all the species that have been attributed to the three genera as belonging to the one genus, *Errina* of Gray, but for convenience of reference I have added after the generic name (*Labiopora*) or (*L.*) in the case of those species that were formerly described as belonging to the genus *Labiopora* and to others that belong to that group of species, and (*Spinipora*) or (*S.*) in the case of *Errina echinata*, the only known species of the *Spinipora* group.

#### Genus ERRINA Gray.

With the characters of the subfamily Errinina (p. 879).

The "*Errina*" group of species.

Cænosteum hard and compact, perforated at the surface by well-defined cænosteal pores usually arranged in rows in shallow longitudinal surface-grooves. Gasteropores with or without a scale. All the dactylopores protected by short grooved spines (narial processes) with the grooves turned towards the apex of the branch.

The only species of this group that have been sufficiently well described to make identification possible without reference to the type specimens, are *Errina labiata* Moseley and *E. ramosa* Hickson & England and *E. horrida* H. & E. Other species are *Errina carinata* Pourtales and *E. pourtalesii* Dall. Pourtales in 1871 described three species, which at first he placed in the genus *Errina* but subsequently transferred them to a new genus, *Lepidopora*. These species were referred back again to *Errina* by Moseley. Their names are *E. glabra*, *E. cochleata*, and *E. dabneyi*. These three species were distinguished from *Errina* by the presence of a lip or lid-like process similar to that of *Cryptohelia* hanging over the gasteropores. *Errina fissurata* of Gray may have been a specimen of *Labiopora*, but as the original specimen has been lost it is useless to speculate on its supposed affinities.

The species may be arranged as follows:—

- \* a. Gasteropores with a definite lip or scale:—  
*E. glabra*, *E. cochleata*, *E. dabneyi*, and *E. ramosa*.
- b. Gasteropores in the angles formed by the branches:—  
*E. horrida*.
- c. Gasteropores without scales and distributed on the surface of the cænosteum:—  
*E. labiata*, *E. carinata*, *E. pourtalesii* (?).

\* See Note p. 894.

As regards the distribution it may be said that all the species are inhabitants of deep water (*i. e.* 50–600 fathoms). Being deep-sea species they are probably widely distributed, but at present *E. pourtalesii*, *E. ramosa*, and *E. horrida* have only been found in the Pacific Ocean and Malay Archipelago, and the remaining species in the Atlantic Ocean.

#### *Spinipora* group of species.

Cœnosteum hard and compact, perforated at the surface by well-defined cœnosteal pores usually arranged in shallow branching grooves irregularly arranged on the surface. Gasteropores without a scale. Dactylopores of two kinds. The larger kind being guarded by long grooved spines (narial processes) crowded and overlapping on the terminal branches, often worn down short and separated by considerable intervals on the stems and older branches (Pl. XCV. fig. 8). All the grooves of these spines turned towards the apex of the branch. Smaller dactylopores not protected by grooved spines, but scattered between and on the projections that guard the larger dactylopores.

The *Spinipora* group is represented by only one species, *Errina* (*S.*) *echinata* Moseley, and this species has been found off Rio de la Plata in 600 fathoms by the 'Challenger' Expedition, and off Providence Island in the Indian Ocean in 75 fathoms by Professor Stanley Gardiner (4).

#### *Labiopora* group of species.

Cœnosteum granular and minutely reticulate, without clearly defined cœnosteal pores. Gasteropores without scales but sometimes protected by short grooved projections or "lips." Dactylopores protected by grooved spines of variable lengths, the grooves turned away from the apex of the branch or irregularly in all directions. Some of the dactylopores usually without grooved spines.

The species of this group that have been described already are *Errina aspera* Gray, *Errina* (*Labiopora*) *antarctica* Gray, *Errina* (*L.*) *moseleyi* Ridley, and *Errina gracilis* von Marenzeller.

*Errina aspera* was the name given by Gray to the Linnean species *Millepora aspera* from the Mediterranean Sea. *Errina* (*L.*) *antarctica* was originally described by Gray as a Polyzoön (*Porella antarctica*), but was subsequently redescribed and figured by Moseley as the type species of *Labiopora*. The type specimen was found off the East coast of Tierra del Fuego, but a second specimen was discovered by the 'Alert' Expedition in 30 fathoms off S.W. Chili and described by Ridley (10). *Errina* (*L.*) *moseleyi* was found by the 'Alert' Expedition off the same coast in 2–10 fathoms. *Errina gracilis* was found off the pack ice in the Antarctic Ocean in deep water (von Marenzeller) (6).

I have had an opportunity of carefully examining a piece of

the type specimen of *Errina* (*L.*) *antarctica* and comparing it with the specimens from various localities mentioned at the beginning of this paper. I have found, as I expected, the same difficulties in the determination of species that are met with in the systematic zoology of other zoophytes. My impression is that all the specimens from New Zealand belong to one distinct species, that the specimen from the Cape of Good Hope belongs to another distinct species, and that both these species are distinct from the four species that have already been described. But there is so much variation in the specimens from New Zealand that it is clearly desirable to have a careful description of each. I have also added for convenience' sake a new description of the two earlier species for comparison.

*ERRINA* (*LABIOPORA*) *NOVÆ ZELANDIÆ*. (*Facies Ramosa.*) (Pl. XCIV. fig. 3 & Pl. XCVI. fig. 9.)

This specimen was obtained from Preservation Inlet, W. coast of South Island of New Zealand, in about 3 fms. of water, and was lent by the Canterbury Museum to Prof. Benham. The colony is flabelliform, with profuse ramification but without anastomoses. The terminal branches are usually delicate. This may be expressed in figures by saying that at a distance of 3 mm. from the extremity of a terminal branch the diameter may be not more than 1 mm. The larger branches are slightly compressed in the plane of the flabellum; the others circular in section.

Colour: salmon-pink\*.

Surface minutely granular, substance of the cœnosteum minutely reticulate.

Grooved spines (narial processes) numerous, arranged in rows, rarely in clusters. The groove, in nearly all cases, turned directly away from the apex of the branch.

Gasteropores more numerous on one side of the flabellum than on the other, sometimes provided with a lip. Diameter of gasteropores 0.27 mm.

Large dactylopores 0.06 × 0.16 mm. (The large kind of dactylopores of the genus are protected by the grooved spines, and the measurements given indicate approximately the width × depth of the groove at its deepest part.)

Small dactylopores rare or absent. The small dactylopores are often difficult to determine until the coral is thoroughly cleaned by boiling in eau de javelle. I have examined and re-examined a small branch thus cleaned and can find no small dactylopores, but as I have only a small amount of material at my disposal, and as Benham states in his MS. notes that the small dactylopores are "rare," I cannot deny their existence.

\* There are so many shades of red to be found in corals that I have used the technical term which expresses the shade of red that comes nearest to that shown by this coral.



ERRINA (LABIOPORA) NOVÆ ZELANDIÆ. (Facies Benhami.)  
(Pl. XCIV. figs. 1 & 2; Pl. XCVI. fig. 13.)

This specimen was also found in Preservation Inlet and lent to Prof. Benham by the Colonial Museum. One branch of this specimen was well preserved in spirit. The colony is flabelliform, with profuse ramification and abundant anastomoses. The terminal branches are thick, the diameter of such a branch at a distance of 3 mm. from the extremity being about 3 mm. All the branches are approximately circular in section.

Colour: salmon-pink.

Surface minutely granular and substance minutely reticulate.

Grooved spines numerous, arranged roughly in rows. These spines are more numerous and longer than in the facies "Ramosa." They are, moreover, frequently arranged in clusters, so that they have the appearance of "branched spines" (fig. 13). The grooves are in general turned away from the apex, but when the projections are clustered they turn in all directions.

Gasteropores equally numerous on the two sides of the flabellum. Without a lip. Diameter varying considerably from 0.13 mm. to 0.17 mm.

Large dactylopores  $0.06 \times 0.16$  mm.

Small dactylopores not infrequent, 0.05 mm. in diameter.

ERRINA (LABIOPORA) NOVÆ ZELANDIÆ. (Facies Dendyi.)  
(Pl. XCIV. fig. 4.)

This specimen was obtained in Milford Sound, W. coast of South Island, and was lent to me by Professor Dendy.

It is not very profusely branched, but probably has a flabelliform mode of growth. The terminal branches are delicate and of approximately the same diameter as those of facies "Ramosa." There are no anastomoses in the specimen.

Colour: salmon-pink.

The surface is minutely granular and the substance minutely reticular.

Grooved spines not very crowded but quite irregularly disposed, not in rows, never in clusters. The groove in all cases turned away from the apex of the branches.

Gasteropores on both sides of the branches but rather more numerous on one side than the other. Usually guarded by a small lip. Diameter 0.22 mm.

Large dactylopores  $0.06 \times 0.11$  mm.

Small dactylopores 0.05 mm. in diameter, usually guarded by a shallow collar or lip.

A feature of this specimen that should be mentioned is the suppression of the spines on the larger branches. Only the terminal branches are echinate.

ERRINA (LABIOPORA) NOVÆ ZELANDIÆ. (Facies Cooki.)  
(Pl. XCV. fig. 5; Pl. XCVI. figs. 10, 11, 12.)

This specimen was obtained from the cable in Cook Straits between the two islands of New Zealand, and was lent to Professor Benham by the Colonial Museum. According to Professor Benham's notes, two specimens were obtained, one being 50 mm. in height  $\times$  70 mm. across, and has six main branches; the other is smaller, 30 mm. in height  $\times$  60 mm. across. The general form of the cœnosteum is flabellate, the main axis flattened but the branches circular in section. The branches do not anastomose in the specimen examined. Only a small piece of one of these colonies was sent to me, and from that I have drawn up the following notes.

Colour: pure white.

Surface and substance as in the other facies.

Grooved spines not very crowded and not arranged in definite rows, frequently in clusters with the grooves pointing in all directions (fig. 12).

Gasteropores evenly distributed on both sides of the flabellum, without any lip or collar, 0.22 mm. in diameter.

Large dactylopores 0.06  $\times$  0.08 mm.

Small dactylopores rare or very rare, 0.09 mm. in diameter.

In comparing these four facies of the species, several points of interest may be observed.

They all agree in the general texture of the cœnosteum, and they all have a more or less flabellate form of growth.

As regards the size of the hydrophytum as a whole, it is impossible, owing to the broken condition of all the specimens examined, to give exact measurements. A specimen of uncertain facies in the Colonial Museum is 90 mm.  $\times$  70 mm. (according to the MS. notes of Professor Benham), the specimen of the facies "Cooki" was 50 mm. in height  $\times$  70 mm. in expanse. Judging from these figures and from the size of the branches of the other specimens, it seems probable that the normal size of a full-grown specimen of the species is not more than 100 mm.  $\times$  100 mm., or that, in words, it is a coral that does not normally attain a very large size.

Of the other characters, perhaps the most important one to consider is the dimorphism of the dactylopores, because this character has been used as a diagnostic character for the separation of the genera *Labiopora* and *Errina*. In the facies "Benhami" and "Dendyi" there are clearly many small dactylopores lying on the general surface of the cœnosteum between the grooved spines and distinct from the larger dactylopores. In the facies "Ramosa" no such dactylopores could be found in the specimen I examined (although Professor Benham says they are rare), and in the facies "Cooki" they are certainly very rare. With the many points of resemblance in form, colour, size of pores, etc. between the two facies "Ramosa" and "Benhami," it would be



very rash to propose that they should be separated into distinct species on account of this one character.

It seems to me, therefore, that the presence of small dactylopores in addition to the dactylopores of the ordinary type, in other words, the character of dimorphism in the dactylopores, is not a character that should be regarded as absolutely diagnostic either of the genus or of any one of its species.

As regards the gasteropores there seem to be some variations. In "Benhami" the gasteropores vary considerably in diameter from 0.13-0.17 mm., but in "Ramosa," "Cooki," and "Dendyi" they are more constant in diameter, being 0.27 mm. in the first named, and 0.22 mm. in the latter. It is probable that these figures are not of much value for systematic purposes. There are many technical difficulties in the way of making accurate measurements of the mouths of a large number of gasteropores on any single specimen, and unless the average diameter of a large number of gasteropores of one specimen can be compared with similar averages from other specimens of the same facies or species, the figures given simply represent a statement of fact concerning a given specimen. The real value of the figures I have given is that they prove that the diameter of the gasteropores is a variable quantity and cannot be used, except in a very general way, as a guide to the determination of species. One point of rather special interest is that in the facies "Ramosa" with slender terminal branches the gasteropores appear to be actually larger than they are in "Benhami" with thicker terminal branches. This seems to indicate that there is no relation between the thickness of the branches and the size of the gasteropores, since the expectation would be that the stouter terminal branches would bear the larger gasteropores.

The presence of a raised margin on one side of the gasteropores in some of the specimens of this species is a feature of some general interest. In some of the gasteropores of the facies "Ramosa" these processes are of considerable size, and bending over the pore have an appearance very similar to the lid of a *Cryptohelia*. In "Dendyi" they are rudimentary, but in the other specimens they are absent.

The presence of a definite lip or scale on the edge of the gasteropore, it must be remembered, was the principal character relied upon by Pourtales for the separation of the genus *Lepidopora* from the genus *Errina*, but if we accept Moseley's view that the species of *Lepidopora* should be incorporated with *Errina*, then we have a parallel series of variations as regards this character in the *Errina* group, to that in the *Labiopora* group.

At one time I thought that the difference in the length of the grooved spines (nariform processes) might be a useful character for the separation of the species in this genus. In all the specimens, however, I found that the projections on the young actively growing terminal branches are longer than they are on the older branches, and consequently there is a difficulty in fixing a standard

of measurement for comparison. Taking the measurement of a few of the projections at a distance of about 3 mm. from the apex of the branches, I have found that the average is in "Benhami" 0.7 mm., and in "Dendyi" 0.4 mm., the projections in "Ramosa" and "Cooki" being intermediate in size between these two measurements. The differences between these averages are so small, and the difficulty of avoiding a relatively large error in the calculation is so great, that the measurements are of no more scientific value than to express roughly the general impression of observation that the projections are longest in "Benhami," shortest in "Dendyi," and of medium length in other specimens. The longest projections in "Benhami" are, however, not simple nariform processes as they are usually in the other facies, but groups of two, three or four of these processes clustered together (fig. 13). The clustering together of the grooved projections may be seen in some of the other facies, such as "Ramosa" and "Cooki," but it is never such a pronounced feature as it is in "Benhami."

Lastly, a word about geographical distribution. All the specimens were dredged off the coast of New Zealand, and two of these four were found in the same bay (Preservation Inlet). There is every reason to believe, moreover, that they were all found in shallow water. In my opinion these facts have some weight in determining the question whether the specimens should be placed in one species or in several species. In a rare genus such as *Errina*, species found at widely separated localities will in all probability be affected by their isolation and show differences that entitle them to rank as distinct species, but there is much less probability that the genus would be able to develop or to maintain specific differences in the same waters. Unless, therefore, a very clear case is made out that the differences between the specimens of the genus *Errina* from New Zealand waters are constant or of fundamental importance, the most convenient as well as most scientific course to pursue is to place them together in the same species.

*ERRINA* (*LABIOPORA*) *CAPENSIS*, sp. n. (Pl. XCV. fig. 7; Pl. XCVI. fig. 15.)

This species is represented in my collection by three broken terminal branches. The largest piece is 36 mm. in length, the diameter at the base is 7 mm., and the diameter of the branch 3 mm. from the apex is 4.5 mm. In the largest specimen of the New Zealand species ("Dendyi") the diameter at the base (evidently the base of attachment) is 6 mm., and the diameter of a branch 3 mm. from the apex is only 2 mm.

From these facts it seems probable that in this species the hydrophytum reaches to much greater dimensions than does that of the New Zealand species.

The branches terminate in blunt, slightly flattened and expanded extremities.

The hydrophytum is probably flabellate in growth, the ramification not very profuse and anastomoses rare.

Colour: salmon-pink.

Surface coarsely granular and substance coarsely reticulate.

As this species seems to approach the *Errina* group in some respects, attention may be called to the striking difference there is between the coarsely granular character of its surface and the fine smooth porcellaneous character of the surface of the *Errina* group.

Grooved spines very short, numerous, quite irregular in arrangement and never in clusters. The form of the spine is that of a shallow semicircular ridge open on the side turned away from the apex.

Gasteropores equally distributed on both sides of the branches, never provided with a lip. Diameter 0.3 mm.

Large dactylopores about 0.25 mm. in diameter.

Small dactylopores:—It may be open to discussion whether there is or is not any true dimorphism of the dactylopores in this species. It has been shown that in one of the specimens from New Zealand ("Dendyi") the small dactylopores are provided with shallow collars. In the Cape specimen some of the dactylopores are considerably less in diameter than the majority, but they are provided with exactly the same kind of semicircular ridge as the larger ones. The question of dimorphism, therefore, resolves itself in this case into a question whether the essential feature of the dimorphism of the dactylopores consists in their size or in the presence of a grooved spine. Ridley states that in *Errina (Labiopora) moseleyi* the dactylopores are of the usual uniform size, and the two kinds can only be distinguished by the presence or absence of nariform processes. These facts seem to emphasize the conclusion that the so-called dimorphism of the dactylopores is not really a feature of very great importance, and to suggest as a probability that the small dactylopores are the shelters for young dactylozooids which in their later stages of growth increase in size and become protected by a grooved spine.

The specimen described and figured by Gray (1872) as *Errina fissurata*, from the Antarctic seas, was apparently very closely related to this species. Unfortunately the specimen has been mislaid (*vide* Moseley) and cannot therefore be re-examined, but the figures show a similar robust habit of growth and short semicircular grooved spines with the grooves all turned away from the apex of the branch.

#### 'ERRINA (LABIOPORA) ANTARCTICA Gray.

*Porella antarctica* Gray.

*Labiopora antarctica* Moseley.

*Labiopora antarctica* Ridley.

The type-specimen was found off the Falkland Islands, 54° 27' S., 59° 40' W., in 45 fathoms.

A second specimen, attributed to this species by Ridley, was found in Trinidad Channel, S.W. Chili, in 30 fathoms.

Hydrophytum flabellate in growth. There is no statement to the effect that the branches anastomose. No record of size beyond the statement that it is smaller than *L. moseleyi*.

Colour: bright crimson, with the compressed forked tips paler.

Surface minutely reticulate. Grooved spines arranged in rows, but not in clusters, on both sides of the branches, all turned away from the apex of the branch.

Gasteropores without a lip, 0.22 mm. in diameter (in the Chili specimen).

Large dactylopores  $0.09 \times 0.2$  mm.

Small dactylopores 0.08 mm., without any lip or collar.

#### ERRINA (LABIOPORA) MOSELEYI Ridley.

The single specimen of this species was found at Port Rosario, S.W. Chili, 2-10 fathoms.

Hydrophytum flabellate in growth. Anastomoses frequent. 95 mm. in height  $\times$  135 mm. in width.

Colour: "vermilion."

"An anterior clearly distinguishable from a posterior surface, by the development on it of numerous tubercles, chiefly in the terminal branches, which are very slightly indicated in the latter." Surface minutely reticulate. Grooved spines not arranged in definite rows nor in clusters.

Gasteropores without any lip, 0.32 to 0.35 mm. in diameter.

Large dactylopores 0.1 to 0.14 mm. in longitudinal diameter.

Small dactylopores without lips or tubercles, of about the same size as the large dactylopores.

#### ERRINA (LABIOPORA) ASPERA Linn. (Pl. XCV. fig. 6.)

I have examined the type-specimen of this species in the British Museum on which Gray (1) founded the genus *Errina*. There can be no doubt that the affinities of the species with the genotype of *Labiopora* are closer than they are with Moseley's *Errina labiata*. It belongs to the *Labiopora*, and not to the *Errina* group of species.

One of the colonies in the British Museum is 80 mm. in height by 85 mm. in width. It forms a flabellum with a clear difference between the anterior and posterior surfaces. The branches terminate in fine points and do not anastomose. The branches are about 3 mm. in diameter at a distance of 3 mm. from the apices. The surface is minutely granular. The grooved spines sometimes occur in clusters, but when solitary the grooves are turned away from the apex of the branch. There are a few small dactylopores without spines and some with small or rudimentary spines. This specimen was dredged off the coast of Sicily.

A little while ago a specimen of a Stylasterine coral was sent to me by the late Mr. John Morgan of Worthing. It was purchased in a sale and there was no record of its locality.

At first I thought it should be placed with the other specimens

in my collection in the species *Errina (L.) novae zelandiae*, but, on comparing it with the specimens in the British Museum, I came to the conclusion that it is probably related more closely to *Errina (L.) aspera*. It is moderately branched and roughly flabelliform in growth. The terminal branches are fairly thick, being about 2-2.25 mm. at a distance of 3 mm. from the apex. The branches do not anastomose.

The surface and substance of the cœnosteum are minutely granular.

The grooved spines are very crowded and clustered on the terminal branches, and not arranged in rows (fig. 6). The grooves are turned in all directions, but the majority of them away from the apex of the branch.

The gasteropores are equally distributed on both sides of the flabellum, and are without any lip or collar. Size 0.13-0.17 mm. in diameter.

The large dactylopores are very variable in size,  $.09 \times .09$  mm. to  $.06 \times 0.11$  mm.

The small dactylopores are very numerous, 0.06 mm. in diameter, and provided with small curved lips.

The specimen is like the type in being white in colour.

Mr. Morgan's specimen differs from the type in having rather more slender branches, in having the pores equally distributed on the two surfaces of the flabellum, and in the presence of numerous small dactylopores.

#### ERRINA (LABIOPORA) GRACILIS von Marenzeller.

Several specimens of this species were found by the 'Belgica' Expedition attached to the swabs when dredging off the pack ice in the region of 71° S. and 88° W., *i. e.* about 20 degrees west and 15 degrees south of the Straits of Magellan. The depth is not recorded by von Marenzeller, but it is probably between 500 and 600 metres.

The hydrophytum is flabellate in growth, with well-marked anterior and posterior surfaces. One of the specimens, which proved to be a female, was 25 mm. in height and 30 mm. in width. Another, which proved to be a male, was 100 mm. by 140 mm.

The surface of the cœnosteum is finely wrinkled, and marked with transverse and longitudinal ridges (*Kammchen*). There are apparently no well-marked cœnosteal pores.

Grooved spines not arranged in definite rows, but in irregular clusters or singly. The grooves of the grooved spines turned away from the apex of the branches or sideways.

Gasteropores with a lip, .015 mm. in width.

Large dactylopores sheltered by spinous projections provided with a deep groove.

Small dactylopores with or without a lip.

Colour: white or brownish.

There can be little doubt that this species belongs to the



*Labiopora* group. It is true that the description given by von Marenzeller of the surface of the cœnosteum does not agree with that of the other species of the group, but it does not agree either with the description given of the surface of the cœnosteum of the *Errina* group. The absence of well-defined cœnosteal pores, the grouping of some of the grooved spines in clusters, and the direction of their grooves—all point to the affinities of the species with the *Labiopora* group.

It may be remarked that this is the only species of the group that occurs in deep water.

*Review of the Labiopora Group of Species.*

The careful examination of the specimens belonging to the *Labiopora* group leads me to the conclusion that there are very few characters that can be used with much confidence for the separation of species\*. However, it may be convenient for the present to recognise six species:—

*Errina (Labiopora) aspera* Linn. Mediterranean Sea.

*Errina (Labiopora) antarctica* Gray. Chili and Falkland Islands.  
30 to 45 fathoms.

*Errina (Labiopora) moseleyi* Ridley. Chili. Shallow water.

*Errina (Labiopora) novæ zelandiæ* Hickson. New Zealand.  
Shallow water.

*Errina (Labiopora) capensis* Hickson. Cape of Good Hope.  
30 fathoms.

*Errina (Labiopora) gracilis* von Marenzeller. Antarctic Sea.  
Deep water.

Of these six species *Errina (Labiopora) capensis* appears to be the most sharply defined. It probably attains to a much larger size, has more robust branches terminating in blunt and somewhat flattened extremities. Its substance is coarsely reticular and its surface coarsely granular. The grooved spines are short and semicircular in shape. All the dactylopores are guarded by these spines.

The other five species are very closely related. *Errina (L.) antarctica* appears to be distinguished from the others by the grooved spines being arranged in definite rows, and *Errina (L.) moseleyi* by the differentiation of an anterior from a posterior surface of the flabellum. Of *Errina (L.) novæ zelandiæ* all that can be said is that it appears to be a very variable species which does not exhibit any one particular distinguishing feature. *Errina (L.) gracilis* is distinguished from the others by the texture of the surface of the cœnosteum, and the colour is not red but white or brownish. *Errina (L.) aspera* has a close resemblance to some of the facies of *Errina (L.) novæ zelandiæ*, but it is always white in colour, in this respect resembling the facies "Cooki."

\* See Note, p. 894.